Trichinosis (Trichinellosis)

1. DISEASE REPORTING

A. Purpose of Reporting and Surveillance

1. To identify sources of transmission (e.g., contaminated meat) and to prevent further transmission from such sources.
2. To educate exposed persons about signs and symptoms of disease, thereby facilitating early diagnosis.
3. When the source of infection appears to pose a risk for only a few individuals (e.g., wild animal meat), to inform those individuals how they can reduce their risk of exposure.

B. Legal Reporting Requirements

1. Health care providers: notifiable to local health jurisdiction within 3 work days.
2. Hospitals: notifiable to local health jurisdiction within 3 work days.
3. Laboratories: no requirements for reporting but specimen submission is recommended.
4. Local health jurisdictions: notifiable to the Washington State Department of Health (DOH) Communicable Disease Epidemiology Section (CDES) within 7 days of case investigation completion or summary information required within 21 days.

C. Local Health Jurisdiction Investigation Responsibilities

1. Begin follow up investigation within one working day.
2. Report all *confirmed* cases to CDES (see definition below). Complete the standard case report form (at: www.doh.wa.gov/notify/forms/trichinosis.doc) and enter the data into the Public Health Information Management System (PHIMS).

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Trichinosis is caused by nematodes (i.e., roundworms) in the genus *Trichinella*. The species *Trichinella spiralis* occurs worldwide and causes most human infections.

B. Description of Illness

Although most infections are subclinical, illness in humans is highly variable and can range from asymptomatic infection to a fulminating, fatal disease, depending on the number of larvae ingested. During the week after ingesting infected meat, abdominal discomfort, nausea, vomiting and/or diarrhea can occur after ingested larvae mature into adult worms in the intestines. Weeks later as the larvae from these adult worms migrate into tissues, persons often develop fever, myalgias, weakness, malaise, and periorbital edema. Less frequently, persons develop rash, subconjunctival hemorrhages, and subungual splinter hemorrhages. In severe cases, myocarditis, pneumonia, and encephalitis may develop and cause death.

C. Trichinosis in Washington State

DOH receives 0 to 1 reports of trichinosis per year. The rare cases in recent years have been associated with wild game, either cougar or bear meat, eaten raw or as jerky.

D. Reservoirs

Although many different carnivores can be infected, reservoirs include home-raised pigs, horses, rats, foxes, wolves, bear, seals, polar bear, and wild boar.

E. Modes of Transmission

Trichinosis is acquired by eating raw or insufficiently cooked flesh of animals containing viable encysted larvae. In the United States, trichinosis was associated historically with eating undercooked pork from domesticated sources, but now wild game meat is the most common source of infection. After ingestion, larvae develop into adult worms in the epithelium of the small intestine. Gravid female worms then produce larvae, which penetrate the intestinal wall and are disseminated via the bloodstream throughout the body. The larvae become encapsulated in skeletal muscle.

F. Incubation Period

Systemic symptoms usually appear about 1–2 weeks after ingestion of infected meat but may appear between 5 and 45 days depending on the number of parasites involved. Gastrointestinal symptoms may appear within a few days.

G. Period of Communicability

The infection is not transmitted directly from person to person.

H. Treatment

Albendazole or mebendazole appear to be effective when given early in the course of the illness. Although these medications are active against adult worms in the gut, they have little effect on larvae embedding in tissue.

3. CASE DEFINITIONS

A. Clinical Criteria for Diagnosis

A disease caused by ingestion of *Trichinella* larvae. The disease has variable clinical manifestations. Common signs and symptoms among symptomatic persons include eosinophilia, fever, myalgia, and periorbital edema.

B. Laboratory Criteria for Diagnosis

1. Demonstration of *Trichinella* larvae in tissue obtained by muscle biopsy, or
2. Positive serologic test for *Trichinella.*

C. Case Definition (1996)

Confirmed: a clinically compatible case that is laboratory confirmed.

D. Comment

In an outbreak setting, at least one case must be laboratory confirmed. Associated cases should be reported as confirmed if the patient shared an epidemiologically implicated

meal or ate an epidemiologically implicated meat product and has either a positive serologic test for trichinosis or a clinically compatible illness.

4. DIAGNOSIS AND LABORATORY SERVICES

A. Diagnosis

The diagnosis of trichinosis is likely in persons with myositis, fever, periorbital edema, eosinophilia and a history of consuming non-commercial undercooked meat. Laboratory confirmation is commonly made by detection of *Trichinella* specific antibodies in serum drawn at least 3 weeks after infection. The diagnosis can also be confirmed by identification of *Trichinella* larvae in a skeletal muscle biopsy specimen (taken at least two weeks after infection) but a biopsy is not often necessary.

B. Services Available at the Washington State Public Health Laboratories (PHL)

PHL can assist in identifying *Trichinella* species in a muscle biopsy or food specimen, and will forward specimens for serologic testing to the CDC. Contact CDES for approval prior to submitting specimens.

C. Specimen Collection

Please enclose a completed PHL Serology form with serum specimens (available at: http://www.doh.wa.gov/EHSPHL/PHL/forms/serology.pdf) and a PHL Parasitology form with muscle biopsy specimens (available at: http://www.doh.wa.gov/EHSPHL/PHL/forms/Parasitology.pdf).

5. ROUTINE CASE INVESTIGATION

Interview the case and others who may be able to provide pertinent information.

A. Identify Potential Sources of Infection

Ask about possible exposures 5–45 days before onset, including:

1. Handling or eating raw/undercooked pork or pork products
2. Handling or eating raw/undercooked hamburger or wild game meat including wild game jerky
3. Travel outside the United States (determine dates and locations)

B. Identify Potentially Exposed Persons

Identify persons who shared the same exposure as the patient.

C. Environmental Evaluation

If the source of the patient's exposure is a commercial product, contact CDES or the DOH Food Safety Program and begin a traceback investigation.

6. CONTROLLING FURTHER SPREAD

A. Infection Control Recommendations

1. Hospitalized patients should be cared for using standard precautions.
2. No work or child care restrictions are needed.

B. Case Management: No case follow up is needed.

C. Contact Management: None, since the disease is not spread from person to person.

D. Management of Other Exposed Persons

Persons exposed to the same source as the case should be educated about symptoms of trichinosis. Prophylaxis with antiparasitic agents should be recommended to persons who recently ingested contaminated meat.

D. Environmental Measures

1. Potentially infected meat should not be consumed by others.
2. If a commercial meat product is potentially infected, CDES or DOH Food Safety Program should be contacted to coordinate a possible recall of the product.
3. If improper cooking of meat is suspected at a restaurant, the restaurant should be inspected.

7. MANAGING SPECIAL SITUATIONS

A. Possible Foodborne Outbreaks

Trichinosis is not a frequent cause of foodborne disease. Consult CDES if you suspect a common-source outbreak.

8. ROUTINE PREVENTION

A. Immunization Recommendations: None

B. Prevention Recommendations (found at: http://www.cdc.gov/ncidod/dpd/parasites/trichinosis/factsht_trichinosis.htm#prevention)

- Cook meat products until the juices run clear or to an internal temperature of 170° F.
- Freeze pork less than 6 inches thick for 20 days at 5° F or colder to kill any worms.
- Cook wild game meat thoroughly. Freezing wild game meats, unlike freezing pork products, even for long periods of time, may not effectively kill all worms.
- Cook all meat fed to pigs or other wild animals.
- Do not allow hogs to eat uncooked carcasses of other animals, including rats, which may be infected with trichinellosis.
- Clean meat grinders thoroughly if you prepare your own ground meats.
- Curing (salting), drying (to make jerky), smoking, or microwaving meat does not consistently kill infective worms.

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